

Environmental monitoring of the European Hamster in Alsace (France) by satellite imagery: agricultural planning in the context of biodiversity conservation

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Within the context of insuring the long-term viability of the European Hamster populations, the DREAL Alsace (Regional Environmental, Planning and Housing Direction) ordered a study to map the hamsters' environment in Alsace using satellite imagery. SERTIT, a service of the University of Strasbourg with more than 25 years' experience in remote sensing and geo-information production from Earth Observation data, carried out this work in order to rapidly assess the effectiveness of the existing environmental biodiversity protection measures.

The landcover of the whole area populated by European Hamsters in Alsace was mapped from satellite imagery. This operation, highlighting hamster friendly crops (winter cereals and feed crops), bare soils (maize and other spring cultures), artificial features (urban areas and large transport infrastructures), and other features of the green and blue landscape (forest, prairies, vineyards, water bodies), was made around hamster burrows surveyed in 2009, 2010 and 2011, giving an idea of the situation at the end of the rodent's hibernation period.

The cartography clearly underlines some of the threats to the European Hamster in the area: the fragmentation of their biotope by road infrastructure, the proximity of urban areas and agricultural practices (crop type and rotation). In fact the beginning of spring is a key moment for hamster survival because spring crops are bare soils and hamsters find neither food nor protection against predators (foxes and mainly raptors). In fact, the survival and reproduction of the common hamster depends on a fairly dense spatial distribution of winter crops. A good proportion of favourable crops is inefficient if not well distributed. A good distribution of winter crops near every burrow is essential to protect and feed hamsters as well as to provide corridors to facilitate hamster coming together and hence their reproduction. In this work it is proposed to analyse the spatial distribution of favourable crops through density indicators, hence highlighting favourable and unfavourable areas, the first ones being the areas with a denser winter crop environment. They also offer a vision of possible networks and their quality or otherwise, indicating if the biotopes are connected or not, and then reveal ecological corridors at a local scale.

Finally, this work has helped in the monitoring of favourable crops (distribution, evolution) and the targeting of the farmlands where actions have to be planned. The study of the European Hamster's habitat and its evolution is a good illustration of the benefits of high resolution Earth Observation data in characterizing biotopes. Because of the aid to decision support provided by this project's results, DREAL Alsace has extended the monitoring period with SERTIT, in charge of continuing the work through 2012.